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Major Changes in the Global Geostrategic Environment and The Emerging U.S. National Security Strategy

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NWDC

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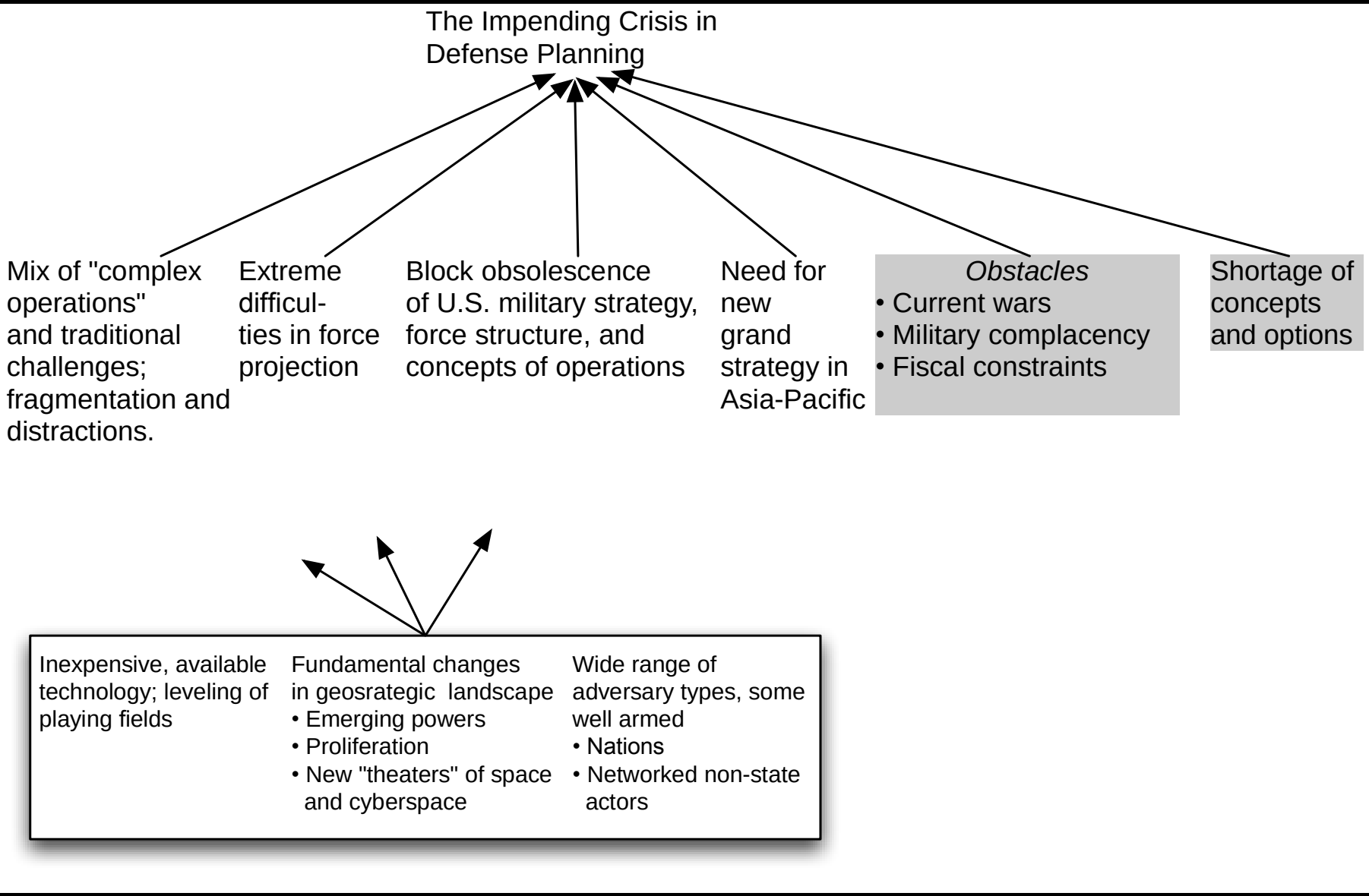
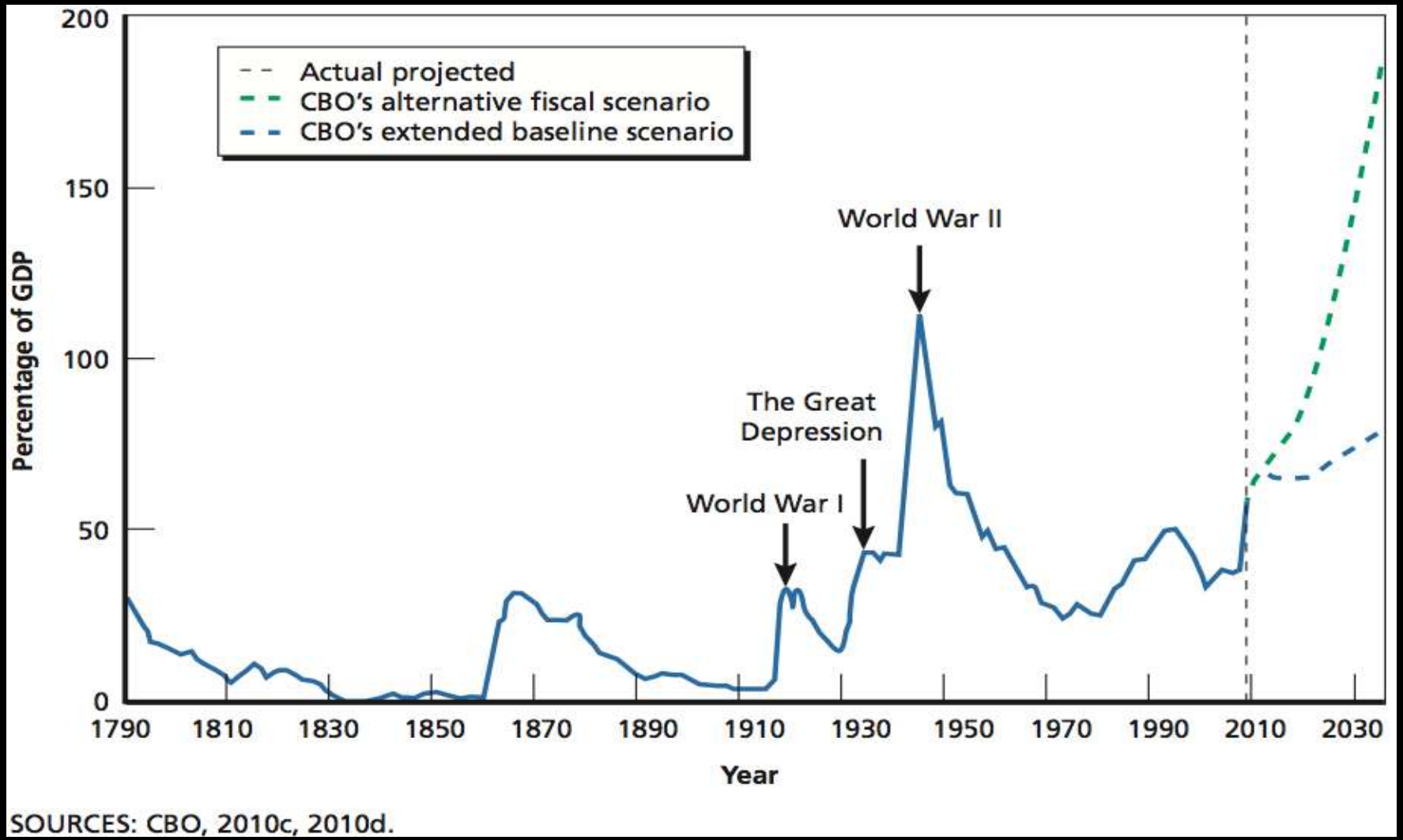
The Perfect National Security Storm



But As National Debt Is Soaring Can DoD Escape?



SOURCES: CBO, 2010c, 2010d.

The Four RMAs of the 20th Century

Four 20th-Century Revolutions in Military Affairs (all continuing)

RMA	Nominal Period of Change (all with older roots)	Characteristic Developments	Label for Resulting Strategy
I	1917–	Mechanization: self-propelled combat vehicles (air, sea, and land)	Industrial warfare
II	1930–	Insurgency; revolutionary, partisan, and guerilla warfare; terrorism	Insurgency
III	1945–	Nuclear weapons; long-range missile delivery	Mass-destruction weapons and strategic bombardment
IV	1980s-	Precision weapons; unmanned combat vehicles; persistent ISR; networked forces; computer-network operations (CNO)	Information technology

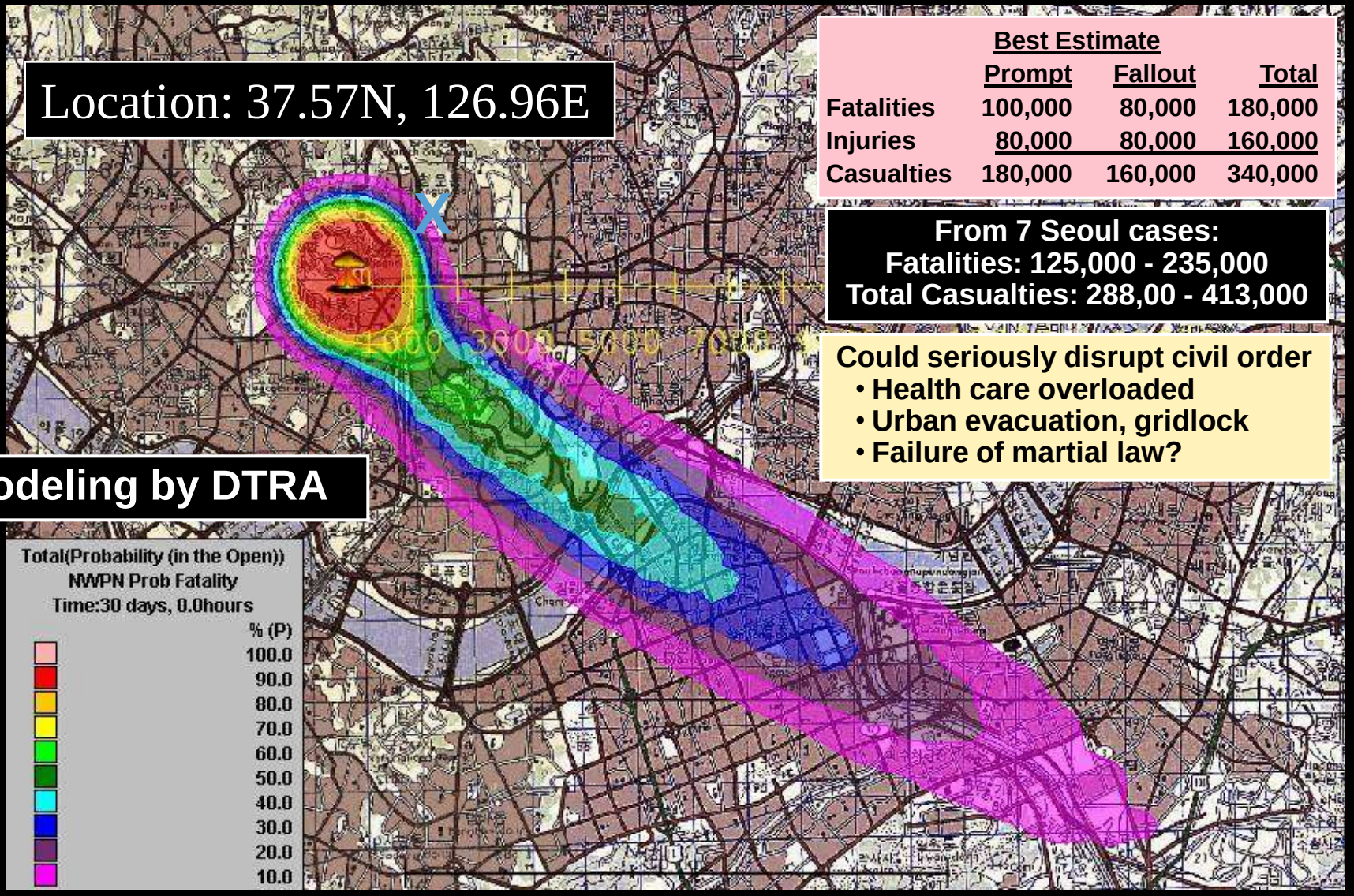
Current Manifestation of RMA – I

RMA II and the Future of COIN

- "Complex Operations"
  - Identifying the "good" guys from the "bad" guys
  - Sophisticated CC&D
  - Supporting governments against insurgents (COIN)
  - Supporting kill/capture operations
  - Very complex terrain – jungles, mountains, urbanization
- Insurgent forces may become much more technologically enabled aka "hybrid" warfare
  - See AQ's exploitation of the global utilities such as the Internet
  - Acquisition of a wide range of PGMs
  - Acquisition of night vision and high performance infantry weapons (Hezbollah)
  - Wide array of stand-off and remote IEDs (Iraq)
- Improved social/human terrain/behavioral understanding
- Need for ubiquitous and persistent ISR capabilities
- Great Cities as Battlefields: More than 50% of the global population is urban
- Now know large scale COIN is protracted, very labor intensive (costly) and may well produce at best a modest and temporary strategic result

Diffusion of RMA – III

North Korean Ability to Cause Civilian Damage



	Best Estimate		
	Prompt	Fallout	Total
Fatalities	100,000	80,000	180,000
Injuries	80,000	80,000	160,000
Casualties	180,000	160,000	340,000

From 7 Seoul cases:
Fatalities: 125,000 - 235,000
Total Casualties: 288,00 - 413,000

Could seriously disrupt civil order
- **Health care overloaded**
- **Urban evacuation, gridlock**
- **Failure of martial law?**

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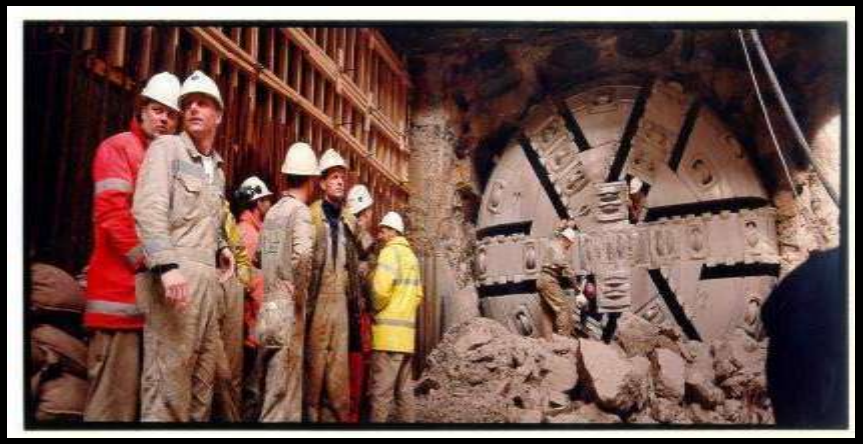
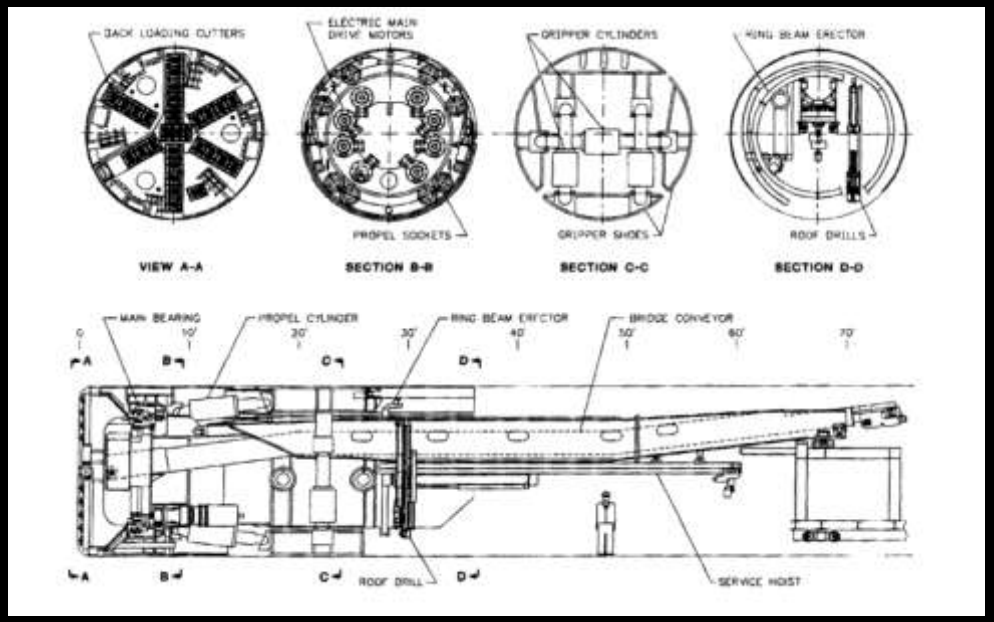
Seoul: 10 Kt Ground Burst, March **Source: Bruce Bennett RAND**

Natanz Uranium Enrichment Plant

- **Iran's commitment to large-scale enrichment**

Tunneling: A RMA I and III Response to RMA IV





Fordow Enrichment Site

- **IAEA Reports: Fordow emerging as superhard enrichment site**

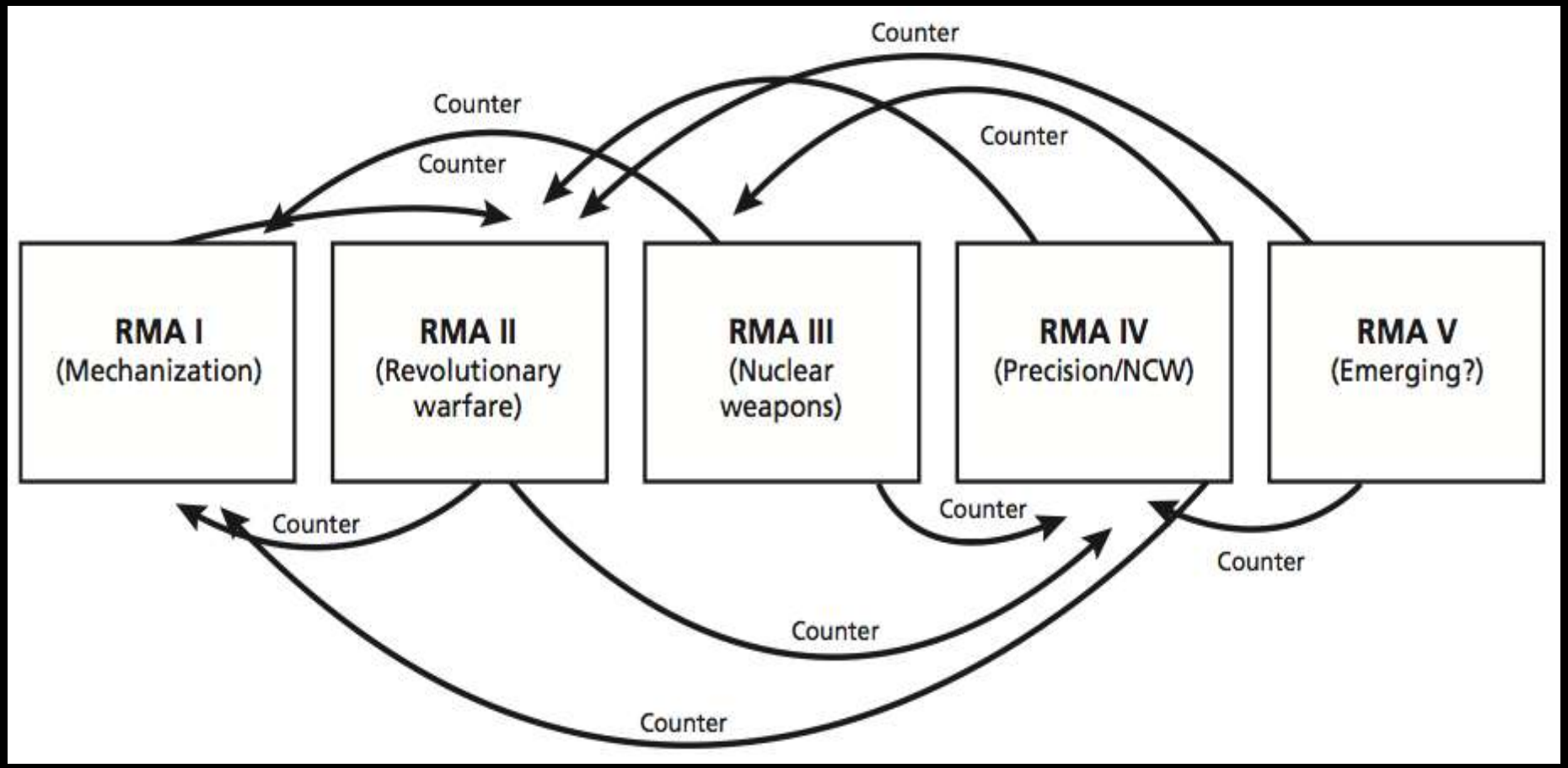
Brazil's Nuclear Power Capacity

- Angra nuclear power plant, Rio de Janeiro, Brazil
  - Two reactors operational = 2000 MWe
  - Third reactor held up do to strong local opposition
- Rsende enrichment plant using advanced electromagnetic levitation centrifuges
  - Objective is an independent fuel cycle to support future expansion of nuclear power and fuel a fleet of nuclear powered submarines.
  - Virtual nuclear weapon production capacity = six 1st generation fission bombs a year

RMA IV – A Contemporary " Recce-Strike Complex" Task Force Observe, Detect, Identify, Neutralize (ODIN) Also USAF's Task Force Liberty – Counter to RMA II?

- **Task ODIN and Liberty: a mix of manned R-12-classs reconnaissance aircraft and Warrior UAS**
  - **Mix of EO, Radar, other sensors**
  - **Tied to Fusion Centers**
  - **Joint operations with Iraq Security Forces (ISF) and NATO/ANA forces in Afghanistan**
  - **Multiple means of neutralizing the identified targets**
  - **Persistent ISR supported by aerostats and hybrid airships**

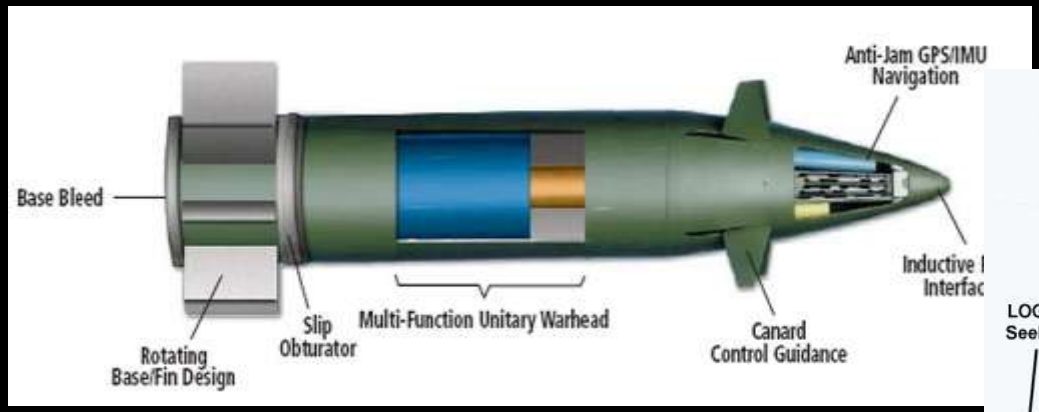
RMAs Persist and Interact Large-Scale "Game" of Measure and Countermeasure

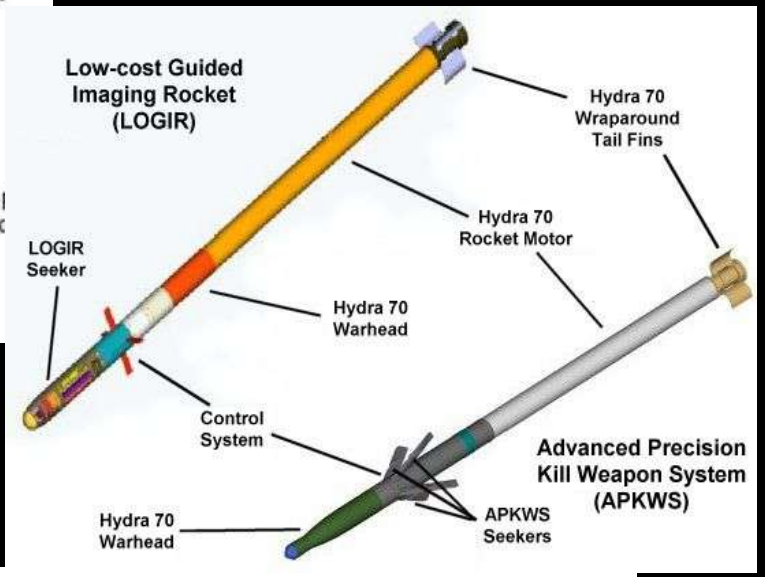


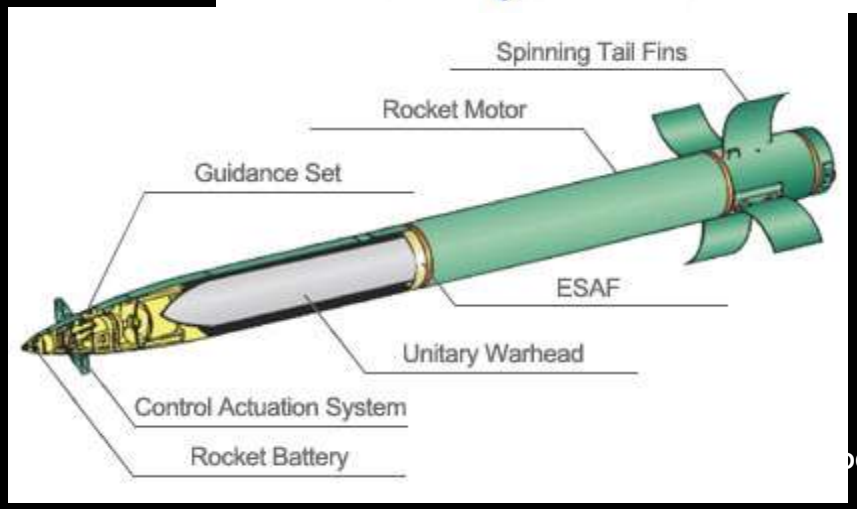
Changes and Diffusion in Military Technology

Technology	Examples
Inexpensive comm.	Internet, cell phones, encryption, GPS sets
Precision weapons	Precision mortars, guided rockets, short- and long-range missiles; cluster munitions
Advanced air defenses	Advanced mobile and man-portable SAMs
Advanced antiship weapons	Air-independent-propulsion submarines, high-speed homing torpedoes, antiship ballistic and cruise missiles, smart and mobile mines
Cyberwar capabilities	Denial-of-service attacks, Trojans and other worms, nuclear and nonnuclear EMP
ASAT capabilities	GPS jammers GPS, RF weapons
Long-range missiles	North Korea, Iran, Pakistan, and others
Space-launch	India, Israel, and perhaps Iran, Pakistan, Brazil, South Korea, North Korea, and others
Nuclear proliferation	Pakistan, North Korea, and perhaps Iran and others
Nonnuclear "WMD"	Radiological, bioweapons, new innovations do-it-yourself biology

Leading Edge of Short-Range Indirect and Direct Precision Fires – Future weapons of "hybrid" warfare – RMA IV enables RMA II





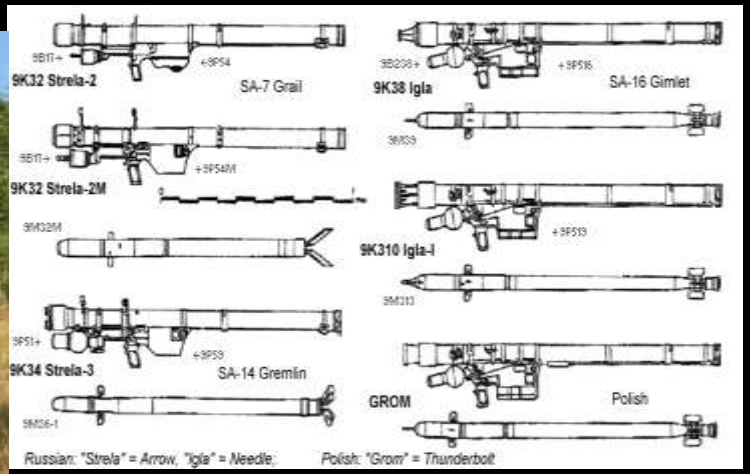


Eurasia Will Have Long-Range PGMs

- Tomahawk class cruise missiles from Pakistan and China
- Emerging MRBM/IRBMs equipped with Maneuvering Re-entry Vehicles (MaRV)
- High performance non-nuclear strategic attack option feasible for many countries
- Iraq may be a major purchaser of this capability to compensate for lack of nuclear program

Evolution of the SAM MANPADS and Tactical SAM

- **Guidance from single color IR to multi-spectral EO to laser beam riding to active radar**



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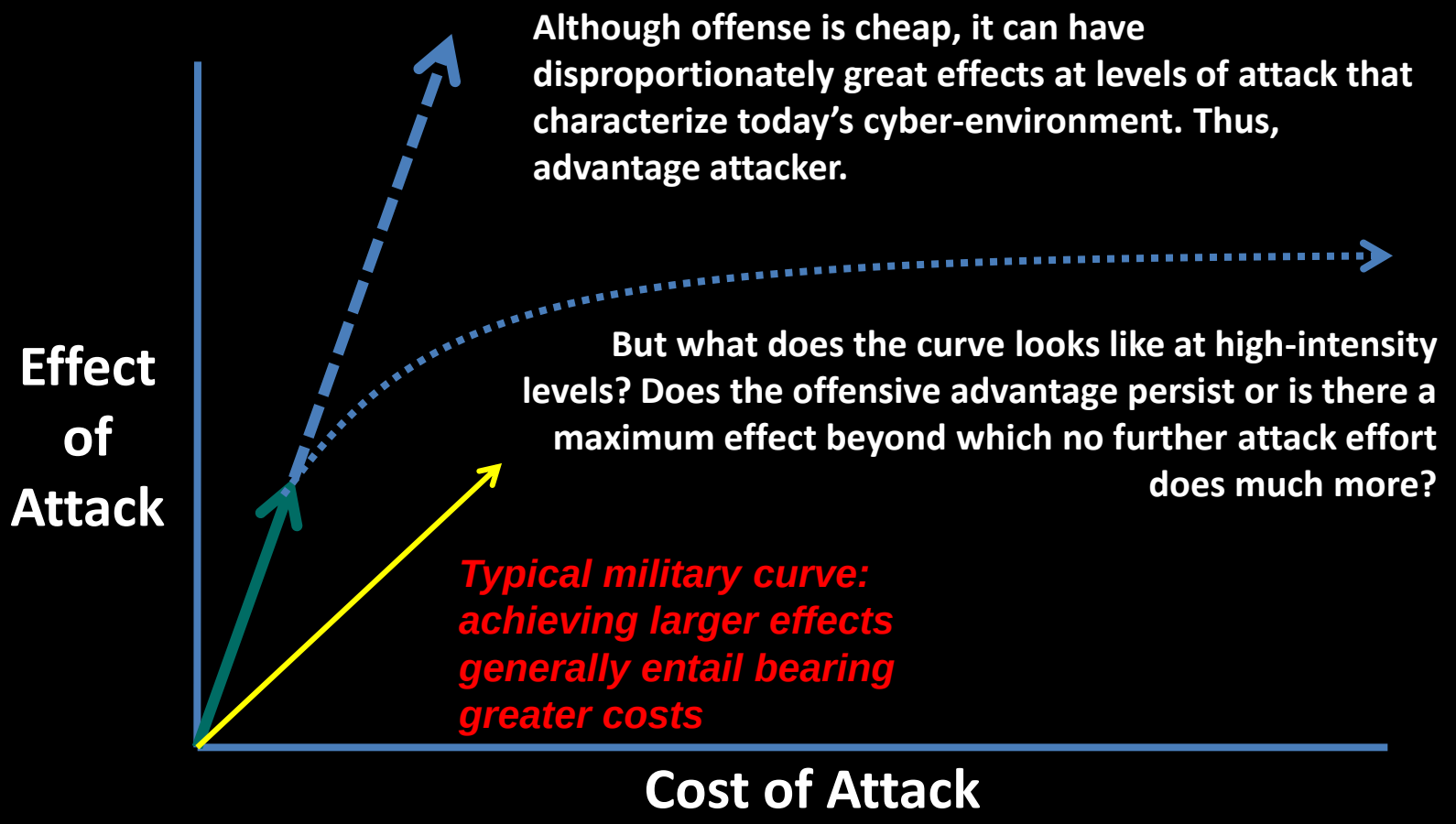
Diffusion of Operational and Strategic SAMs (RMA IV verses RMA I)

- **Russian S-300/400 series and the Patriot – Chinese have developed hybridized variants of both systems**
- **High performance SAMS will severely challenge Low Observable (LO) combat and ISR aircraft**

Is Cyberspace Offense or Defense-Dominated?



Then and "Now"
The Diffusion of RMA IV

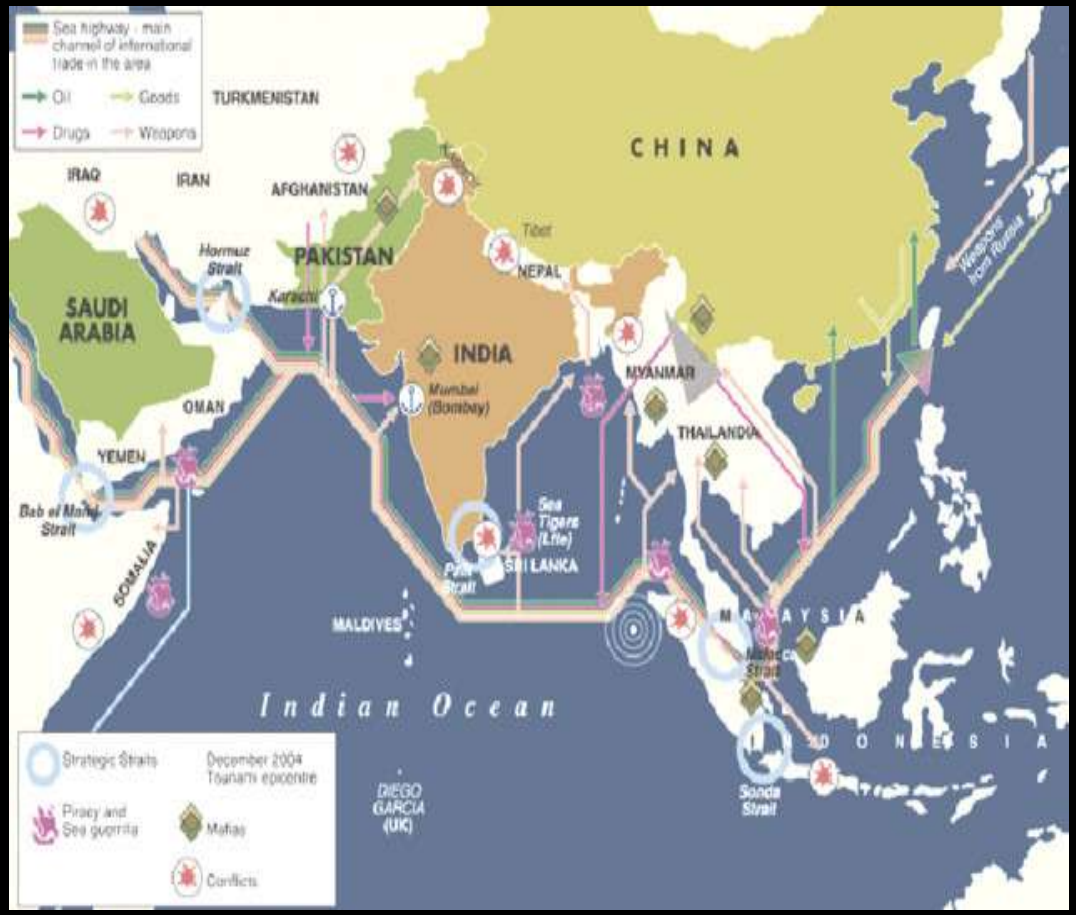
Component	Then	Now, and in Near Future
Forward presence		Restrained
Large forward deployments		Vulnerable bases and risks in regional waters from subs and PGMs
Broad naval supremacy		Emerging anti-access challenges
Air supremacy		From very long range?
SEAD		Mobile and man-portable SAMs
Offensive air ops.		Air defenses, long-range ops., difficulty of finding targets
Ground-force entry		PGMs, area weapons
Later ground ops.		Residual SAMs, vulnerabilities to residual precision weapons
Large follow-up ops		PGMs, area weapons, SAMs

Rivalry Between India and China?

About India and China

- South Asia has become a central feature of the "arc of dynamism" between Southwest Asia and Northeast Asia
- Either an optimistic or "surprise free" projection of China-India relations suggest one dominated by economic competition and cooperation with military competition muted
- On the other hand, military competition including the prospect of regional conflict may emerge if only due to the Chinese infrastructure investments to the east, north, and west of India
  - How will India react to the emergence of China as a major power along the Indian Ocean littoral?
  - Chinese "string of pearls" strategy is underway
    - Chinese construction of port in Gwadar, Pakistan
    - Military assistance to Pakistan, Sri Lanka, Bangladesh, and Burma
- Risks and benefits of India as "Strategic Partner"

A new political economic model to challenge the "Washington Consensus" – a consensus that may well have been transformed by the current global financial and economic crisis – Rise of authoritarian state capitalist regimes?

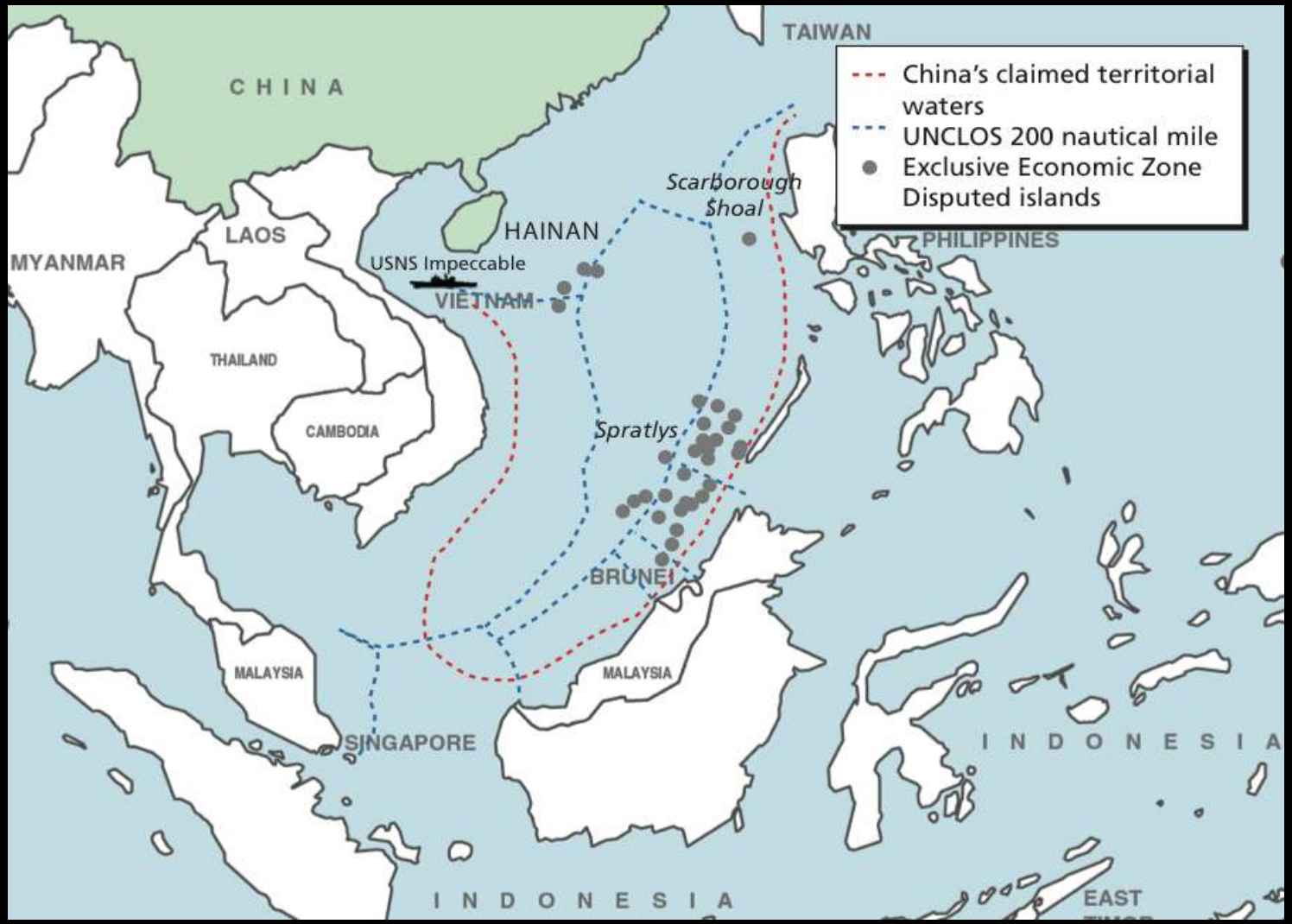


Civil Engineering Trumping IT?

China and India Will Have Advanced Military Capabilities

- **Full spectrum of tactical and theater range PGMs by China, Russia, India, others for a global market**

Disputed Islands in South China Sea



U.S. "Way of War" Becoming Obsolete? Diffusion of RMAs III & IV

- **Acquisition of 1st generation nuclear arsenal**
  - **1st generation nuclear arsenal will quickly become a 2nd generation arsenal**
  - **Deployed in a survivable manner**
  - **Diverse means of delivery**
- **Long-range precision strike = acquisition of nuclear weapons?**
  - **One ton warhead delivered by ballistic or cruise missile 2000 km with CEP of 10 meters or less**
  - **GPS enabled precision guided artillery, rockets, and mortars**
- **Threatens the classic MCO-oriented "American Way of War"**
  - **Assumed mastery of RMA-I and RMA-IV**
  - **Reliance on "air supremacy"**
  - **Reliance on secure NSS architecture**
  - **Reliance on large and fixed bases**
  - **Reliance on close in deployments (approx. 500nm)**
  - **Logistically intensive ground forces**
  - **Forcible entry techniques developed from WW-II**

Service Questions To Be Answered
USN

- **How will the fleet fight in the face of high-end anti-access and counter-C4ISR threats? How will the fleet prepare for combat operations in which much of the peacetime C4ISR infrastructure has been degraded or destroyed?**
- **How will the fleet operate in the face of precision-weapon threats and counter-C4ISR threats but the need to have on-the-scene presence for deterrence? What is the joint Navy/Air Force operational concept in the conduct of war with a near-peer opponent, as a function of policy decisions? Is it to build a comprehensive capacity to militarily defeat that major power, a capacity to reliably hold at risk a large array of targets of value, or something else?**
- **What should be the size, capacity, and role of the Navy and Marine concept of fighting and sustaining ground forces from the sea? What level of threat can be challenged by amphibious assault forces? Should the USN procure a sea base capable of supporting a substantial USMC/Army expeditionary force from the sea?**
- **What is the appropriate mix of building blocks for future Navy fleets as aircraft-carrier battle groups are forced to longer range? What is the long-term investment mix between submarines, surface ships, and carriers?**

Diffusion of Precision Guided Long-Range Missiles (RMA IV)

- **Tomahawk class cruise → PRC → Pakistan**
- **Emerging MRBM/IRBMs equipped with Maneuvering Re-entry Vehicles (MaRV), e.g., the ASBM**

The Aircraft Carrier in Sunset?
RMA IV verses RMA I

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Major BMD Mission – Inherent ASAT?

Aegis BMD SM-3 Evolution Plan

Block IA	Block IB	Block II	Block IIA
Block 2004 • 1-Color Seeker • Pulsed DACS	• 2- Color Seeker - Increased IR Acquisition - Improved Discrimination • TDACS - Increased Divert - Lowers AUR Cost • All-Reflective Optics (ARO) • Advanced Signal Processor (ASP)	High Velocity Variant • Block IB Seeker • 21" Propulsion - 2nd & 3rd Stage - Increased Missile Vbo = xx • 21" Nosecone • MK 41 VLS Compatible	High Divert Variant • Large Diameter KW - Advanced Discrimination Seeker - High Divert DACS • 21" Propulsion - 2nd & 3rd Stage - Increased Missile Vbo = yy • 21" Nosecone • MK 41 VLS Compatible
Block 2004	Block 2008	Block 2010 / 2012	Block 2012 / 2014

Funded Since PB06 | Capability Change From Previous Block

Approved for Public Release 06-MDA-1922 (13 SEP 06)

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Broad Area Maritime Surveillance (BAMS)

- **USN's major BAMS investment:**
  - **NG Global Hawk Variant**
  - **Boeing P-8A Poseidon MRA**

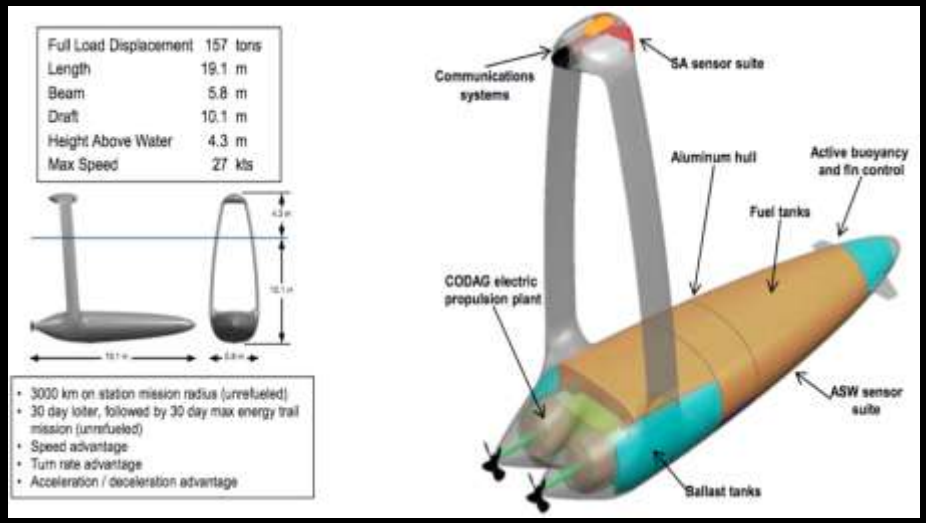
UCAS-S (strike) vice UCAS-R (ISR)
Prospect of UCAS with BAMS-type Features

X-47B Configuration 441-2 (UCAS-D)	X-47B Configuration 442 (CDRO)
Identical Size and Planform	
	
Pratt & Whitney F100-PW-220U powerplant	Advanced powerplant (same envelope as F100)
Interim Nozzle Configuration (INC)	LO exhaust with aft deck
LO design provisions/representative features	Full LO treatments
Off-the-shelf subsystems	Optimized subsystems
Provisions for mission sensors	Multi-function AESA radar, EO/IR and ESM
Provisions for weapons bays and stores	Weapons bays and stores for ISR and Strike
Conservative structural design	Optimized structural design
Zero fuel weight: 28,903 lbs	Zero fuel weight: 27,836 lbs (ISR) 31,836lbs (strike)
Internal fuel: 15,664 lbs	Internal fuel: 19,664 lbs (ISR) 15,664lbs (strike)
Mission takeoff gross weight: 44,567 lbs	Mission takeoff gross weight: 47,500 lbs
Max takeoff gross weight: 47,500 lbs	Max takeoff gross weight: 47,500 lbs
Max carrier landing gross weight: 35,000 lbs	Max carrier landing gross weight: 35,000 lbs
Max unrefueled endurance: >6 hours	Max unrefueled endurance: >14 hours
Max unrefueled range: >2,100 NM	Max unrefueled range: >5,000 NM
Note: Max range and endurance based on ferry reserves and no weapon bay fuel tanks	*Note: Max range and endurance based on 4,000 lbs weapon bay fuel and CDRO CV reserves*

U.S. Naval Deep Strike Options

- **Surface warships and SSGNs could be armed with MaRV equipped ballistic missiles or hypersonic cruise missiles or NG LO cruise missile?**
- **The problem of going "Winchester" before operational and strategic objectives are met during "Second Pacific War"**

Circa 2020: Advances in UMVs



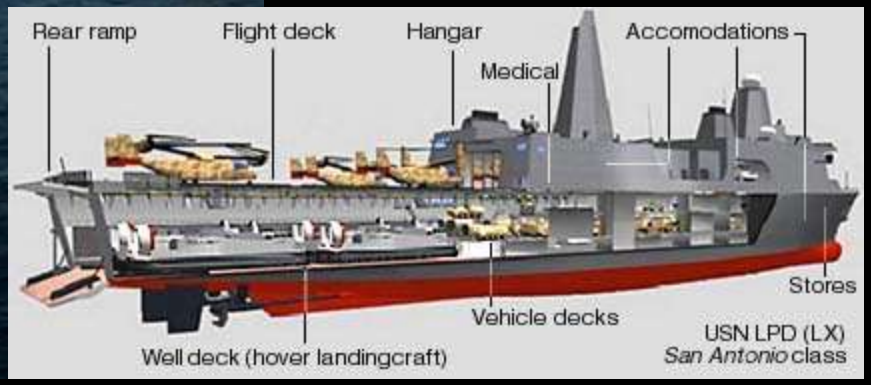
- **Similar to the trends on UAS and UGV system, UMS, especially UUVs may move into two very different directions. There is likely to be a family of high endurance and high payload UUVs that can be deployed for surveillance, countermine and mine laying. New developments in small UUVs with reconnaissance missions similar to micro UAVs and UGVs will likely emerge as well.**

Service Questions To Be Answered Marines and SOF

- **Against what anti-access threat should the Marines be prepared to conduct amphibious operations? For what size of operation?**
- **What is the balance between air and sea amphibious assault, maneuver from the sea by VTOL, and lower-level littoral operations, including protracted COIN operations?**
- **SOF**
- **Should SOF become the primary means of U.S. power projection with combined-arms forces? Should the SOF structure be expanded? Can it be, without serious degradation of quality and increased attendant risks?**
- **What is the relationship and relative emphasis of the foreign forces' training mission with the big services? Will that be role expanded or turned over in part to a permanent training structure within the Army, USAF, and USN?**
- **How will SOF adapt to the diffusion of RMA IV tools and techniques to potential state and nonstate adversaries?**

Contemporary Amphibious Capability

- The Landing Craft Air Cushion (LCAC) aka hovercraft
- A mix of air capable and LCAC capable "gray hulled" amphibious ships



The Expeditionary Fighting Vehicle (EFV) – RMA I checked by RMA IV

- **AFV designed to operate as a planning hull assault vessel and convert to a armored fighting vehicle**

Mexican Drug Cartels: When TCOs Become de Facto Insurgents

- Cartels act as transnational criminal organizations (TCOs) with increasingly effective para-military capability
- May have financial, other ties with transnational terrorist organizations (TTOs)
- Hyper-violent TCOs challenge viability of Mexican national government
  - Acquisition of PGM and other advanced infantry-type weapons
  - Operating in both rural and urban settings
- Challenges of Neutralizing TTOs and TCOs
  - Targeting in the face of natural and man-made noise
    - Accurately indentifying perpetrators (insurgents) in civilian populations
  - Increasingly sophisticated OPSEC
    - Next generation highly encrypted cell phones and internet traffic
  - Unraveling financial networks
  - Corruption, infiltration of law enforcement, military, and government
    - How to enable government OPSEC
- Local criminal and terrorist organizations may have levels of technological, organizational, and operational competence similar to the government

High Performance Infantry Weapons

Targeting terrorism

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Service Questions to Be Answered
USAF

- **How will the Air Force conduct operations against opponents well equipped with anti-access and counter-C4ISR capability?**
- **How will the Air Force fight in the face of high-end anti-access and counter-C4ISR threats? How will it prepare for combat operations in which much of the peacetime C4ISR infrastructure has been degraded or destroyed?**
- **How expansive should the Air Force mission be in space? What is space supremacy, how can it be made operational, and at what cost?**
- **As a function of policy decisions, what is the joint Navy/Army operational concept in the conduct of war with a near-peer opponent? Is it to build a comprehensive capacity to militarily defeat that major power, or is it the capacity to reliably hold at risk a large array of targets of value? How will the Air Force support Army and Marine maneuver forces during high-intensity combat operations in the presence of defenses?**
- **How much should the Air Force rely on UASs? How much should the Air Force invest in non-space hedges, such as enduring UASs?**
- **Should the Air Force give priority to the development and deployment of a new-generation strategic bomber at the expense of its short-range fighter-bomber modernization plan?**
- **What are the critical design requirements of the new-generation bomber? Should it revolve around low observability and penetration, or around it being a superheavy arsenal-ship configuration with standoff weapons?**
- **What are the implications of a much smaller but longer-range combat fleet on the tanker requirements?**

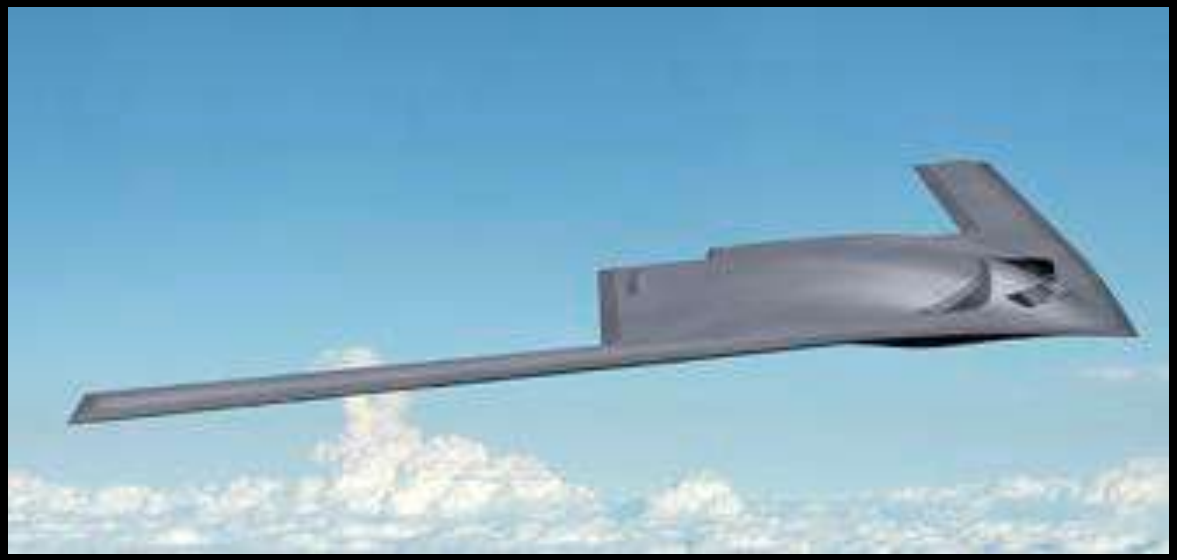
Modern Interdiction/Close Air Support – RMA I & IV Superiority Unprotected RMA I AFVs

Evolution of Stealth Aircraft
The Twilight of the Manned Combat Aircraft?

- **The B-49 Flying Wing leads to the B-2, F-22, and F-35**

Long-Range Strike Bomber or B-3

- **Apparent USAF design consensus: High altitude LO subsonic bomber**
- **May fight with an array of UAVs and UCAS in Networked Operations**



Circa 2020: Very Long Endurance UAS

Global Hawks Refueling

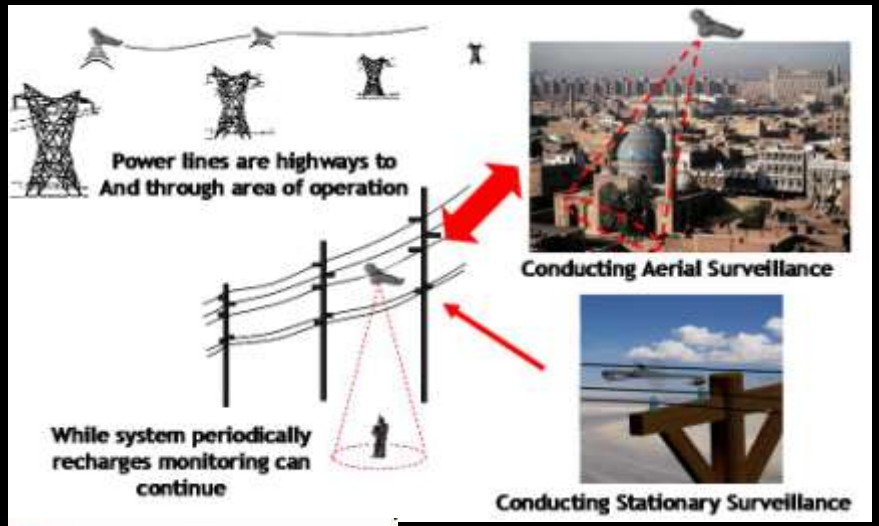
SkyCat

HAV

BA Solar Eagle

- **Very long endurance UAS will have fully matured. Several winged and/or hybrid airship designs will provide multi-week if not multi-month endurance to act as pseudo-satellites.**

Circa 2020:
Micro UAS Living off the Land?



Diffusion of ASAT Capabilities

India, China, And other Major powers will likely have a wide Range of ASAT options by 2020

F-15 ASAT Test

Co-orbital ASAT

Mobile Tactical DEW Defenses

"Tactical" Laser DEW may emerge as "blinding" ASAT

Chinese Medium bomber as SLV/ASAT launcher

Emergence of Other NSS Architectures (RMA III legacy)

- **Russia, China, Japan, Europe, India building their own space architectures**

Will Mutual Dependence On Space Domain Provide for Deterrence?

- U.S. clearly dominant and dependent on its NSS architecture
  - Alternatives to that architecture include high altitude and long endurance UAVs
- China, India, EU, Japan, Russia will likely build and depend upon their own substantial NSS architectures
- Global economic dependence on space infrastructure
- Threshold of kinetic ASAT may be high – deterrence effective?
  - DEW may disable satellites without destroying
  - Micro "inspector/attack" satellites may disable without destruction
  - One or more major power may develop work around – accept collateral damage
  - Smaller "crazy" states – DPRK threatening HAND to hold global LEO satellites hostage?
- This is not the same environment as cyberspace and cyberwar

Service Questions to Be Answered U.S. Army

- **What are the appropriate building-block units for the future Army, for diverse types of operation? Is it still the brigade combat team or something else?**
- **How reliant should the Army be on Air Force and Navy airpower for indirect fires and ISR support, given the trade-offs between deployability and sustainability on the one hand and the threat to aircraft from defenses on the other? How does the answer change as units become smaller and single-battery indirect fires become more feasible?**
- **How much of the Army's structure and design take on SOF-like features?**
- **What should the Army's modernization objectives be, given adaptive adversaries exploiting both insurgency tactics and information-technology methods (RMAs II and IV)?**
- **How should the Army conceive its portfolio of capabilities and capacities across COIN operations, high-end expeditionary operations, balance-of-power considerations, and smaller-scale contingencies?**
- **What are the missions and investment requirements for the Army Reserve and National Guard?**

FCS Brigade Combat Team…

18 Integrated Systems + 1 Network + 1 Soldier – After FCS?

Manned Ground Vehicles (MGV)

Infantry Carrier Vehicle (ICV)

Command and Control Vehicle (C2V)

Mounted Combat System (MCS)

Reconnaissance And Surveillance Vehicle (RSV)

Common Chassis

Non-Line of Sight Mortar (NLOS-M)

Non-Line of Sight Cannon (NLOS-C)

Medical Vehicle Treatment (MV-T

FCS Recovery and Maintenance Vehicle (FRMV)

Medical Vehicle Evacuation (MV-E)

Unmanned Aerial Systems (UAS)

Class I UAV

Class IV UAV

Unattended Ground Systems (UGS)

T-UGS

U-UGS

Tactical and Urban Unattended Ground Sensors

Non-Line of Sight Launch System NLOS-LS

Unmanned Ground Vehicles (UGV)

MULE-C

Multifunction Utility/ Logistics and Equipment Countermine and Transport

MULE-T

Armed Robotic Vehicle – Assault (Light) (ARV-A-L

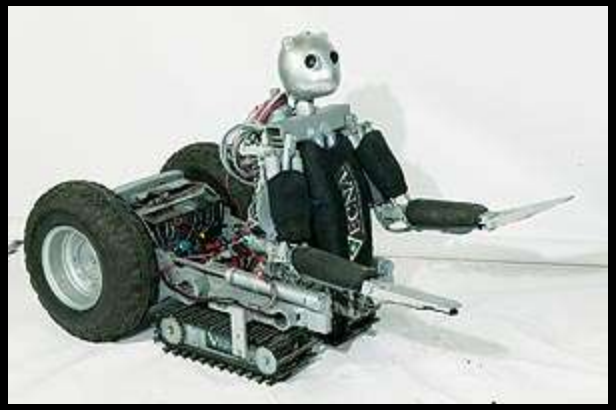
Small UGV (SUGV)

Soldier-Centric, Network-Enabled

Post 2020: Semi-Autonomous/Autonomous UGVs

- **Fully autonomous armed UGVs are unlikely to emerge in the next twenty years. On the other hand, a wide range of logistic systems may have emerged to provide "mechanical mules" for dismounted forces. Investments in cooperative behavior may extend the envelope in this regard.**

Post 2020: Humanoid versus Centaur UGS



- **Humanoid robot concepts may fall out of favor for "centaur" type systems that may to have superior mobility features - the direct competitor may be the powered exoskeleton.**

AFVs of the Future? (RMA IV verses RMA I)

- **Super Heavy MBTs, GCV, Lighter Wheeled AFVs?**

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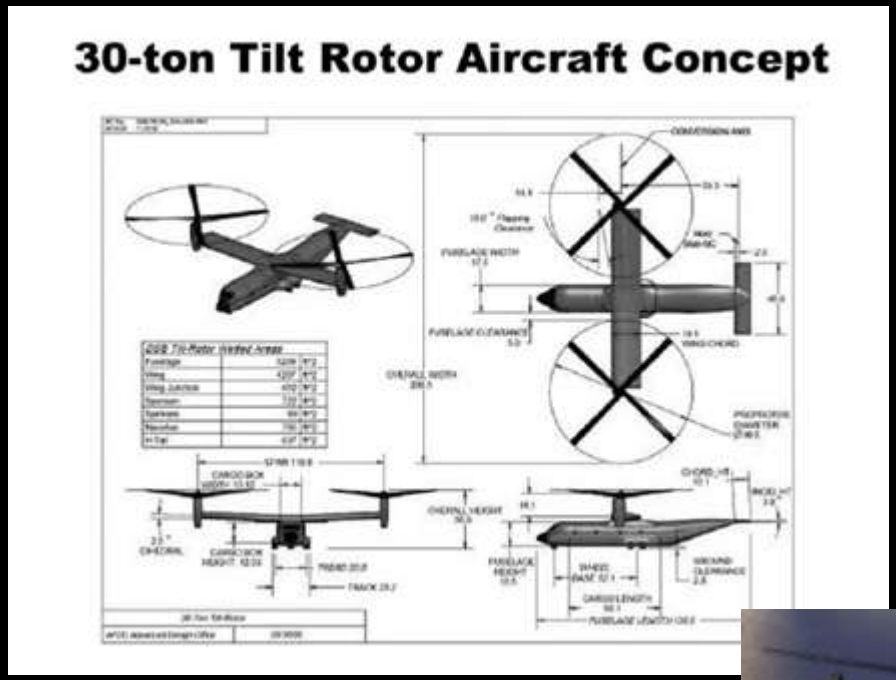
Next Generation Combat Support Aviation

- **A major investment in new generation of VTOL/SSTOL Aircraft?**



*Hezbollah: Prototype Hybrid*Threat*

- State-like capabilities
  - Long Range Missiles
  - Anti-ship Cruise Missiles
  - Anti-armor systems
  - UAVs
  - SIGINT
- Selected tactics—
  - Highly trained in traditional and irregular modes
- Extensive preparations
- Exploitation of political effects

****Frank Hoffman's definition***

"Hezbollah's combat cells were *a hybrid of guerrillas and regular troops*-- a form of opponent that U.S. forces are apt to encounter with increasing frequency." Ralph Peters

Nigeria – Posture Child of Failing State?

- Population of some 160 million
- Roughly 250 ethnic groups
- Half of population most in north is Muslim
- South region dominated by Christians and Animists
- Chronic tension between north and south – recent surge of Boko Haram terrorism
- North Hausa support for "Al Qaeda Franchise Network"
- Movement for the Emancipation of the Niger Delta (MEND)
  - More powerful with support in Biafra region
- Thousands of Western, Chinese and Russian citizens working the energy and mining industries

Cyber Conflict Issues for Decision: What Issues are Most Important?

- **Attack Assessment**
  - **Responsibilities/authorities for deciding what constitutes a *strategic* cyber-war attack**
  - **Process to be followed by critical infrastructure owners and operators in terms of their response to perceived *strategic* cyber attacks on U.S. critical infrastructures**
  - **Process to be followed by the COCOMs/Services/Agencies in terms of their immediate response to perceived *strategic* cyber attacks on U.S. allies or "strategic interests" in their areas of responsibility**
- **Employment Policy**
  - **Division of authorities for strategic CNE/CNA (e.g., command and control) between the COCOMs, NSA, and the NCA/NSC**
  - **Division of responsibilities for carrying out *strategic* CNE/CNA (COCOMs and NSA)**
  - **Nature and extent of preplanned strategic CNA options**
  - **Deterrence/extended deterrence issues**
    - **U.S. response to a/the first *strategic* cyber attack on the United States**
    - **U.S. response to a/the first *strategic* cyber attack on U.S. allies or "strategic interests"**
- **Declaratory Policy**
  - **Near-term policy choices (e.g., aspects of employment policy) that the United States should make part of U.S. declaratory policy choices (public; convey privately to allies or prospective adversaries)**
  - **Strategy and long-term goal choices underlying policy decisions**
- **Acquisition/Investment Strategy**
  - **Personnel challenges**
  - **Attribution/situational awareness**
- **International Cooperation**
  - **Degree and character of consultation with U.S. allies on key strategy and policy decisions**
  - **Consultation with U.S. allies on a long-term goal for strategic cyberwarfare**

Primary Missions of New U.S. NMS
A Priority List

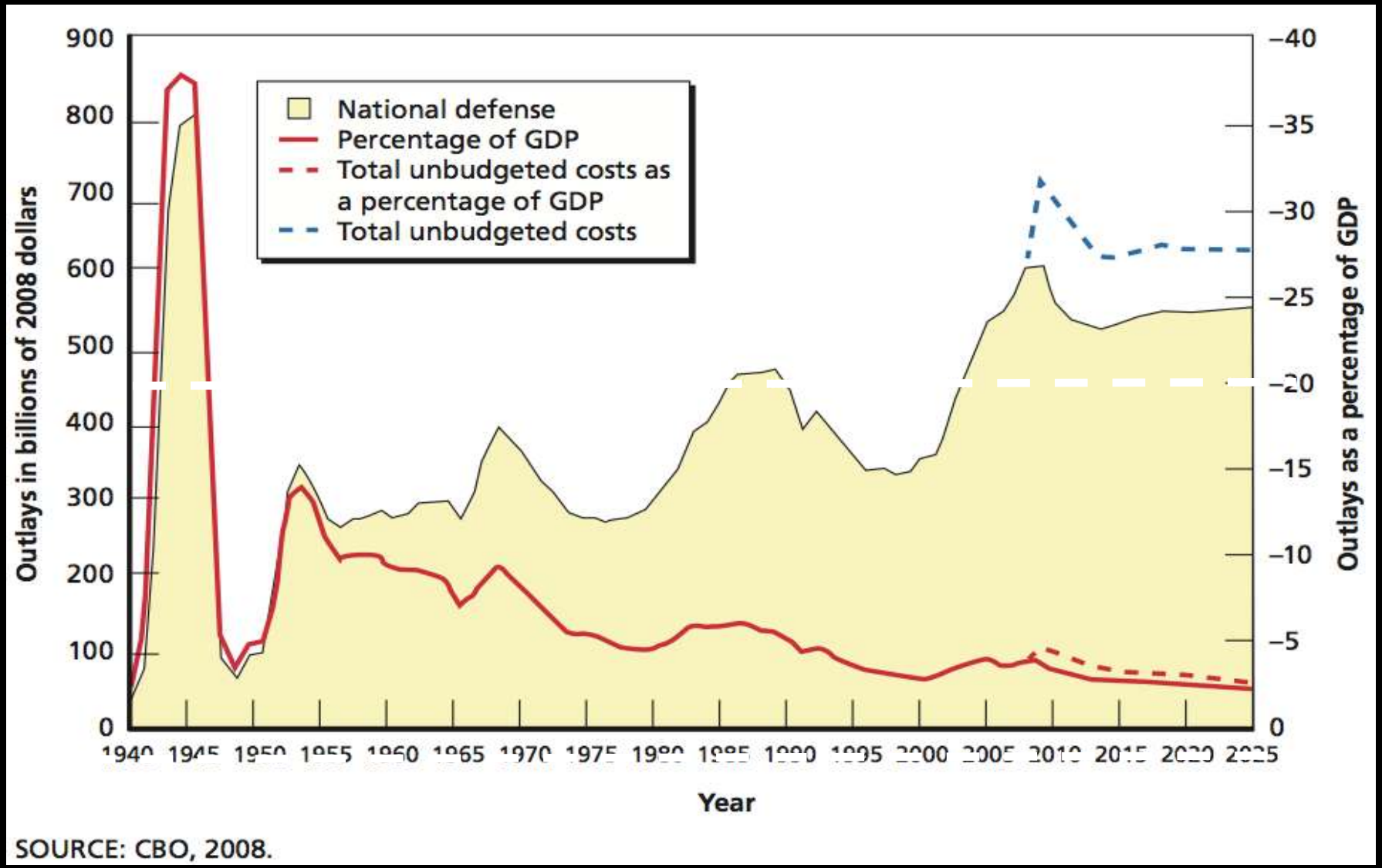
- **Counter Terrorism and Irregular Warfare**
- **Deter and Defeat Aggression**
- **Project Power Despite Anti-Access/Area Denial Challenges**
- **Counter Weapons of Mass Destruction**
- **Operate Effectively in Cyberspace and Space**
- **Maintain a Safe, Secure, and Effective Nuclear Deterrent**
- **Defend the Homeland and Provide Support to Civil Authorities**
- **Provide a Stabilizing Presence**
- **Conduct Stability and Counterinsurgency Operations**
- **Conduct Humanitarian, Disaster Relief and Other Operations**

R&D Investment Priorities

- Next generation UAVs and UCAV
  - Reduced investment in next gen UGS after end of FCS
- Long-Range Strike Aircraft
- High-speed follow-on to Tomahawk cruise missile
- Development of high performance (survivable) recce-strike capacity
- Cruise and Ballistic Missile Defenses
- Merged CNO and Classic EW
- Strategic Cyber Offense and Defense
- Alternative energy sources
- AFV survivability in face of anti-armor threats
- Next generation VTOL aircraft and survivability measures
- Soldier mobility, survivability, situation awareness, and firepower

Back Up

DoD Budget: Highest Since WWII, Smaller in Burden



SOURCE: CBO, 2008.

USAF's Vision of Beyond the Global Hawk

RQ-4 (Blk10)
- Collection – ISR
  - Basic SAR
  - Basic EO/IR

RQ-4 (Blk 20/30/40)
- Collection:
  - *Block 20*
    - Enh SAR
    - Enh EO/IR
  - *Block 30*
    - Adv SIGINT
  - *Block 40*
    - MP-RTIP Radar
    - GMTI and concurrent SAR
    - High Range Resolution
    - No EO/IR or SIGINT

MQ-La
- EW
- Collection ISR
- C2
  - Connectivity
  - A/GMTI
  - Information Integration

MQ-Lb
- EW
- Collection ISR
- C2
  - Connectivity
  - A/GMTI
  - Information Integration
- Airlift
- Air Refueling
- Humanitarian Assistance

MQ-Lc
- Modular, Autonomous
- EW
- Collection ISR
- C2
  - Connectivity
  - A/GMTI
  - Information Integration
- Strategic Attack
- Global Strike
- CAS
- Air Interdiction
- Air Mobility
- Airlift
- Air Refueling
- Humanitarian Assistance Ops

Now → Future

Airmobile Capability, a Vietnam Legacy

- **Traditional airmobile infantry assault operations – unchanged from Vietnam War era**

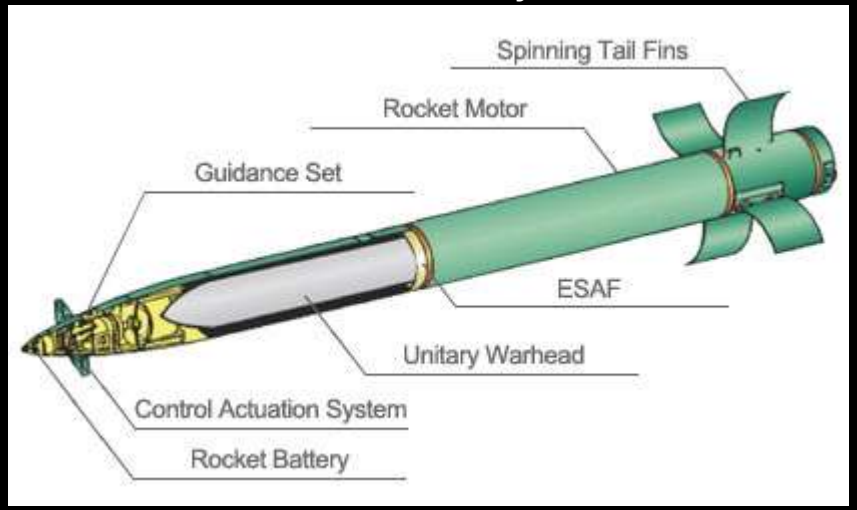
RMA IV Threats to RMA I-type Forces

- Likely acquisition of PGMs by regional states and possibly insurgents
- U.S. and allied forces at risk from mobile SAMs, ATGMs and long-range PGMs

Isreali Spyder Mobile SAM system

Chinese Mobile SAM System

Javelin Third Gen ATGM



Guided Multiple Launch System Rocket (GMLRS)

Evolution of the Battle Tank (RMA I response to RMA IV)

- **M-60 with homogenous armor to spaced/laminated armor and use of the reactive armor**

Nothing is Invulnerable

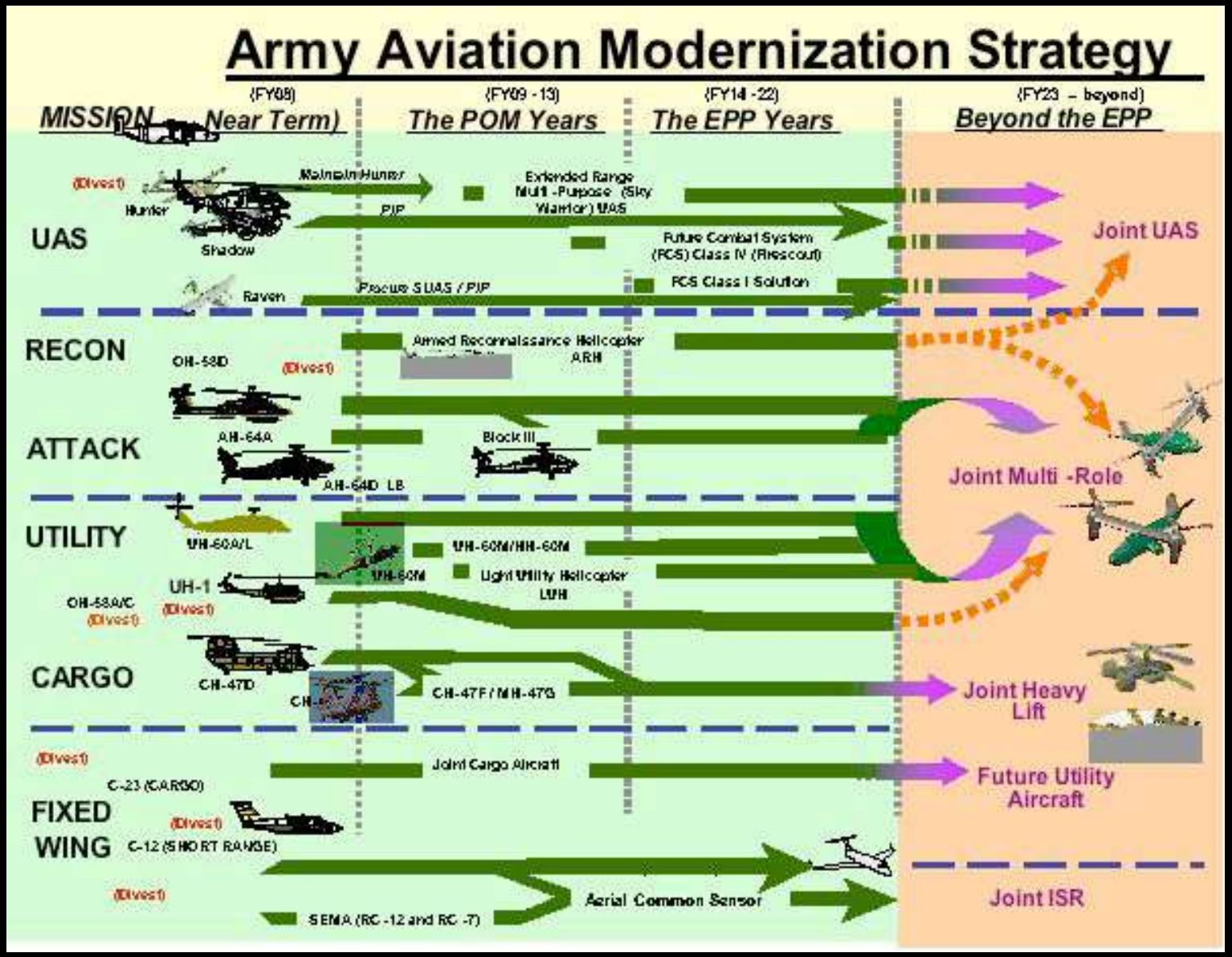
Destroyed T-72 in Georgia 2008
M-1A1 destroyed by friendly fire and RPGs

RAND

Airborne Forces = 21st Century Cavalry?

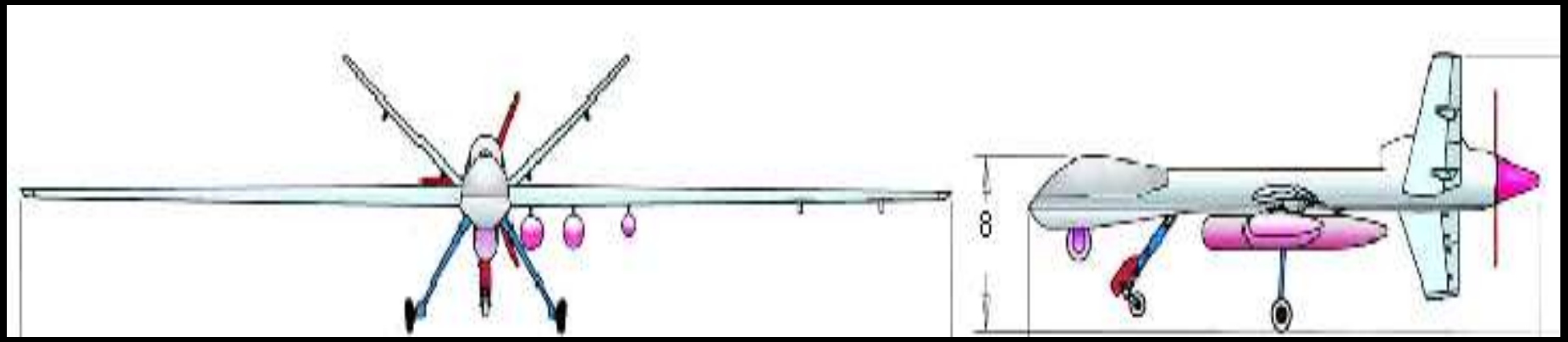
- **Airborne operations have remains relatively unchanged since 1942**
- **Soviets develop a "desant" concept to dropping paratroopers in light AFVs such as the BMD-III shown below**

Army Aviation → UAS Dominated?

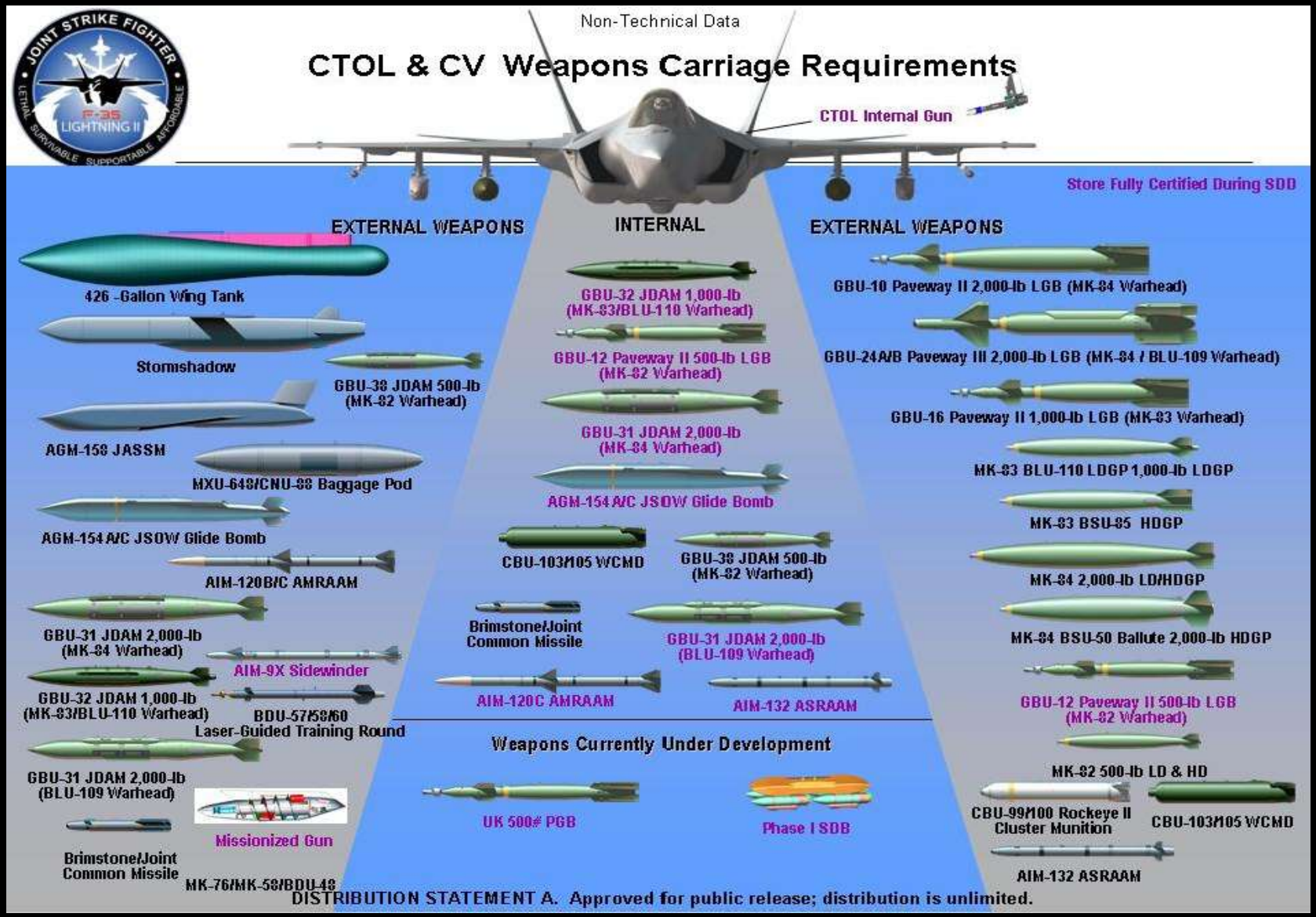


Evolution of the Unmanned Aerial System (UAS) (RMA IV)

UCAS Emerges
The Hunter Killer
RQ-9 Raptor



The F-35: The Last Manned Fighter Bomber?



Evolution of UCAS

MQ-1
- Collection – SIGINT/FMV
- CAS

MQ-9
- Collection – SIGINT/FMV
- CAS

MQ-X/Ma
- EW
- Connectivity
- Information Integration
- Collection
- CAS
- Special Ops ISR

MQ-9
- Collection
  - SIGINT/FMV
  - Gorgon Stare/ARGUS
  - SAR/GMTI
- CAS

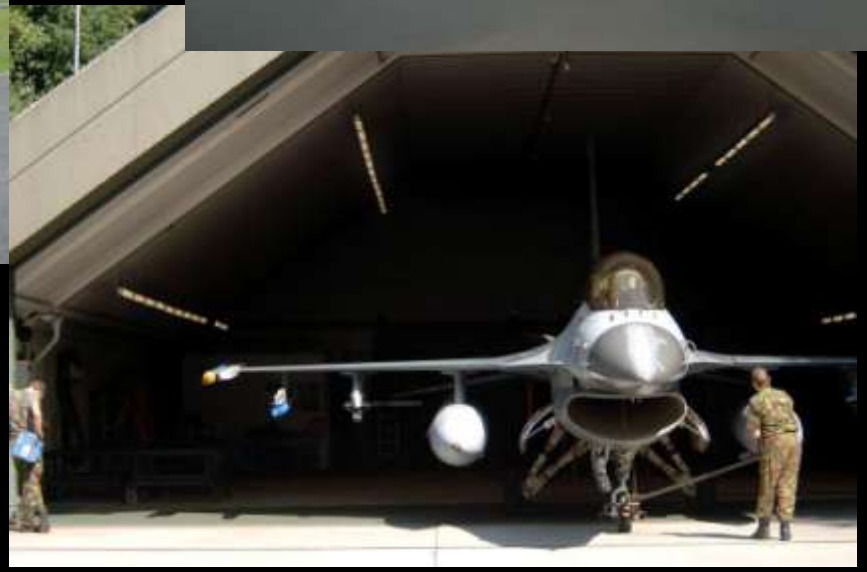
MQ-Mb
- Modular, Autonomous, SWARM
- EW
- SEAD
- Connectivity
- Information Integration
- Collection
- CAS
- Air Interdiction
- Special Ops ISR
- AAR-R
- Aeromedical Evacuation
- Personnel Recovery

MQ-Mc
- Modular, Autonomous, SWARM
- EW
- SEAD
- Connectivity
- Information Integration
- Collection
- CAS
- Air Interdiction
- Special Ops ISR
- AAR-T
- Aeromedical Evacuation
- Personnel Recovery
- CounterAir
- Missile Defense
- Strategic Attack

Now → Future

Other Adaptation Options

- **Fortifying Airfield to the level of the U-boat pens of Lorient?**



Possible Futures

1. **Opposed force projection in decline because price is too high**
2. **Opposed force projection will have to depend on surprise actions**
    1. **Overnight seizure of islands?**
    2. **First strikes (cyber or kinetic) to neutralize defenses during insertion of forces**
    3. **First strikes against WMD capabilities**
3. **Warfare becomes more costly again (more prolonged high-intensity operations)**

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